



## MS75N75

75V N-Channel MOSFET

### Thermal Resistance Characteristics

| Symbol          | Parameter           | Typ. | Max. | Units |
|-----------------|---------------------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-Case    | --   | 1.43 | °C/W  |
| $R_{\theta JA}$ | Junction-to-Ambient | --   | 62.5 |       |

### On Characteristics

| Symbol       | Parameter                         | Test Conditions                   | Min | Typ.  | Max.  | Units    |
|--------------|-----------------------------------|-----------------------------------|-----|-------|-------|----------|
| $V_{GS}$     | Gate Threshold Voltage            | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0 | --    | 4.0   | V        |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS} = 10 V, I_D = 3.75 A$     | --  | 0.014 | 0.017 | $\Omega$ |

### Off Characteristics

| Symbol                         | Parameter                                 | Test Conditions                                                     | Min | Typ. | Max.      | Units   |
|--------------------------------|-------------------------------------------|---------------------------------------------------------------------|-----|------|-----------|---------|
| $BV_{DSS}$                     | Drain-Source Breakdown Voltage            | $V_{GS} = 0 V, I_D = 250\mu A$                                      | 75  | --   | --        | V       |
| $\Delta BV_{DSS} / \Delta T_J$ | Breakdown Voltage Temperature Coefficient | $I_D = 250\mu A$ , Referenced to 25°C                               | --  | 0.08 | --        | V/°C    |
| $I_{DSS}$                      | Zero Gate Voltage Drain Current           | $V_{DS} = 75 V, V_{GS} = 0 V$<br>$V_{DS} = 60 V, V_C = 125^\circ C$ | --  | --   | 10<br>100 | $\mu A$ |
| $I_{GSSF}$                     | Gate-Body Leakage Current, Forward        | $V_{GS} = 20 V, V_{DS} = 0 V$                                       | --  | --   | 100       | $\mu A$ |
| $I_{GSSR}$                     | Gate-Body Leakage Current, Reverse        | $V_{GS} = -20 V, V_{DS} = 0 V$                                      | --  | --   | -100      | nA      |

### Dynamic Characteristics

| Symbol    | Parameter                         | Test Conditions                                 | Min | Typ. | Max. | Units |
|-----------|-----------------------------------|-------------------------------------------------|-----|------|------|-------|
| $C_{ISS}$ | Input Capacitance                 | $V_{DS} = 25 V, V_{GS} = 0 V,$<br>$f = 1.0 MHz$ | --  | 3000 | --   | pF    |
| $C_{OSS}$ | Coss Output Capacitance           |                                                 | --  | 1100 | --   | pF    |
| $C_{RSS}$ | Crss Reverse Transfer Capacitance |                                                 | --  | 250  | --   | pF    |

### Switching Characteristics

| Symbol       | Parameter           | Test Conditions                                     | Min | Typ. | Max. | Units |
|--------------|---------------------|-----------------------------------------------------|-----|------|------|-------|
| $t_{d(on)}$  | Turn-On Time        | $V_{DS} = 37.5 V, I_D = 75 A,$<br>$R_G = 25 \Omega$ | --  | 25   | 60   | ns    |
| $t_r$        | Turn-On Rise Time   |                                                     | --  | 300  | 700  | ns    |
| $t_{d(off)}$ | Turn-Off Delay Time |                                                     | --  | 150  | 310  | ns    |
| $t_f$        | Turn-Off Fall Time  |                                                     | --  | 180  | 370  | ns    |
| $Q_g$        | Total Gate Charge   | $V_{DS} = 60 V, I_D = 10 A,$<br>$V_{GS} = 75 V$     | --  | 85   | 110  | nC    |
| $Q_{gs}$     | Gate-Source Charge  |                                                     | --  | 15   | --   | nC    |
| $Q_{gd}$     | Gate-Drain Charge   |                                                     | --  | 40   | --   | nC    |

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#### Source-Drain Diode Maximum Ratings and Characteristics

| Symbol   | Parameter                                     | Test Conditions                                                                  | Min | Typ. | Max. | Units         |
|----------|-----------------------------------------------|----------------------------------------------------------------------------------|-----|------|------|---------------|
| $I_S$    | Continuous Source-Drain Diode Forward Current |                                                                                  | --  | --   | 75   | A             |
| $I_{SM}$ | ISM Pulsed Source-Drain Diode Forward Current |                                                                                  | --  | --   | 300  |               |
| $V_{SD}$ | Source-Drain Diode Forward Voltage            | $I_S = 75\text{ A}$ , $V_{GS} = 0\text{ V}$                                      | --  | --   | 1.5  | V             |
| $t_{rr}$ | Reverse Recovery Time                         | $I_S = 75\text{ A}$ , $V_{GS} = 0\text{ V}$<br>$diF/dt=100\text{ A}/\mu\text{s}$ | --  | 90   | --   | ns            |
| $Q_{rr}$ | Reverse Recovery Charge                       |                                                                                  | --  | 250  | --   | $\mu\text{C}$ |

#### Notes:

1. Repeativity rating : pulse width limited by junction temperature
2.  $L = 0.32\text{mH}$ ,  $I_{AS} = 75\text{A}$ ,  $V_{DD} = 25\text{V}$ ,  $R_G = 25\Omega$  , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 75\text{A}$ ,  $di/dt \leq 300\text{A}/\mu\text{s}$ ,  $V_{DD} \leq \text{BVDSS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
5. Essentially independent of operating temperature.

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